Basics of Quality Improvement

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Session Time: 3:00 – 3:45
Objectives

• Discuss and understand Quality Improvement Theory
• Recognize the steps in writing an Aim Statement and Quality Measures
• Discuss QI tools such as process diagrams and key driver diagrams
• Bonus: Review the basics of run and control charts (If time permits)
Aims for Improvement

• Institute of Medicine, Crossing the Quality Chasm: Health Care in the 21st century

• Define 6 key dimensions for improvement
  – Safe
  – Timely
  – Effective
  – Efficient
  – Equitable
  – Patient-Centered
Aims for Improvement

• Safe: Avoid injury from the care intended to help
• Timely: Reduce waiting for both patients and those who give care
• Effective: Match care to science; avoid overuse of ineffective care or underuse of effective care
• Efficient: Reduce waste
• Equitable: Close racial and ethnic gaps in health status
• Patient-Centered: Honor the individual and respect choice
Quality Improvement?

Addressing care gaps using practical and robust methodology that can lead to results that are measurable and sustainable.
Quality is a way to ensure we are providing Great Care

- National Committee for Quality Assurance

Atul Gawande on NCQA
Examples of QI Themes

- Decrease Clinic Wait Times
- Improve Diabetes Care
- Establish a Stroke Center Designation
- Be a Level 1 Trauma Center
- Decrease Overuse
- Increase utilization of Evidence Based Medicine
- Diagnosis and treatment of Lower Back Pain
Selecting a Condition or Area of Care

Consider the following:

• Does it result in high levels of morbidity/mortality?
• Is it high cost?
• Does it result in high rates of health care utilization?
• What is the potential for quality improvement?
  – Usually focus on conditions/areas of care where we suspect performance may not be optimal
• Who would be accountable for improvement?
  – Do they have control over the mechanisms for improving care?
Review of the Scientific Literature and Expert Consensus Guidelines

- Medline
- CINAHL
- Cochrane Library
- EMBASE
- Web of Science
- BMJ Clinical Practice
- Secondary Searches using Reference Lists
- AHRQ National Guidelines
- Guidelines from National Professional Organizations or other Institutions
Model for Improvement

Part 1:
- Three fundamental questions
- Can be asked in any order

Part 2:
- The Plan-Do-Study-Act (PDSA) cycle to test change in real work settings.
- The PDSA cycle guides the test of a change to determine if the change is an improvement.

Source: IHI, Model developed by Associates in Process Improvement
Model for Improvement

• Emphasizes the difference between making a change and making an improvement.
• Compare change resets a process to “normal”
• Improvement making a change with measurable effect
Applying the Model for Improvement

- Set an aim
- Establish measures
- Identify changes
- Test change
- Implement changes
Setting Aims: What are we trying to accomplish?

• Improvement requires setting aims.
• We can’t improve without a clear and firm intention to do so.
• Important to people involved
• Smaller, short-term aims can contribute to bigger ones
Global Goal to AIM

• Start with a theory
  – Ex: Increasing rates of hand hygiene will lead to less disease transmission to patients and thus reduce rates of hospital-acquired infections.

• Decide what your target for your narrower aim.
  – Ex: Increasing rates of hand hygiene

• Get SMART about it.
SMART Aim

- Specific – population of patients affected
- Measurable – give specifics 50% ➔ 70%
- Achievable – People and resources available
- Realistic – Stretch but not impossible
- Timely – Time specific “by June 1\textsuperscript{st} or within 6 mons”

Ex: Increase rates of hand hygiene compliance in SICU from 65% to 85% by Jan 1\textsuperscript{st}.
QI Aim Ideas

• Reduces adverse drug events in critical care by 75% within 1 year.
• Improve medication reconciliation at transition points by 75% within 1 year.
• Increase the number of surgical cases between cases with surgical site infection by 50% within 1 year.
• Reduce waiting time to see urologist by 50% within 9 months.
Forming the Team

• Include the right people on a process improvement team is critical to a successful improvement effort.

• Teams vary in size and composition.
Forming the Team

• First, review the aim.
• Second, what system will be affected by the improvement efforts?
• Third, include members familiar with all the different parts of the process
  – Managers, administrators
  – Physicians, pharmacists, nurses, front line workers
  – Executive sponsor who takes responsibility for the success of the project
Individual and Group Time (5 mins)

- Global Goal
- Aim
- Team Members
Science of Improvement: Establishing Measures

• How will we know that a change is an improvement?
• Measurement is a critical part of implementing changes
• Measures tell a team whether the changes they are making actually lead to improvement.
• There’s a difference with measure for improvement compared to research
Types of Measures

• Different from measuring for research
  – Goal to gather enough data to inform whether to adapt, adopt, or discard an idea.

• Outcome Measures

• Process Measures

• Balancing Measure
Outcome Measures

• Where are we ultimately trying to go?
• How does the system impact the patients, their health and wellbeing?
• How does it impact stakeholders such as payers, employees, or the community?
• Diabetes: Average hemoglobin A1c
• Access: # of days to 3rd next available appointment
• ICU percent unadjusted mortality
• Adverse drug events per 1,000 doses
Process Measures

• Are we doing the right things to get there?
• Are the parts/steps in the system performing as planned?
• Diabetes: % of patients whose hemoglobin A1c level was measured twice in the past year
• Access: Average daily clinician hours available for appointments
Balancing Measures

• Are changes designed to improve one part of the system causing new problems in other parts of the system?

• For reducing time patients spend on ventilator after surgery: Make sure reintubation rates are not increasing

• For reducing patient length of stay in the hospital: Make sure readmission rates are not increasing
## Guidelines vs. Quality Measures?

<table>
<thead>
<tr>
<th>Clinical Guidelines</th>
<th>Quality Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehensive:</strong> Cover virtually all aspects of care for a condition</td>
<td><strong>Targeted:</strong> Apply to specific clinical circumstances where there is evidence or strong expert consensus regarding a process-outcome link</td>
</tr>
<tr>
<td><strong>Prescriptive:</strong> Intended to influence provider behavior prospectively at the individual patient level</td>
<td><strong>Observational:</strong> Measure provider behavior at an aggregate level; applied retrospectively</td>
</tr>
<tr>
<td><strong>Flexible:</strong> Intentionally leave room for clinical judgment and interpretation</td>
<td><strong>Precise:</strong> Precise language that can be applied systematically to ensure comparability across different sites of care</td>
</tr>
</tbody>
</table>
Six Key Steps to Developing Quality Measures

1. Select a condition or area for measure development
2. Conduct a review of the scientific literature and expert consensus guidelines
3. Consider potentially relevant data sources
4. Draft quality measure statement(s)
5. Consider factors related to the measure denominator
6. Consider factors related to the measure numerator
Consider Potentially Relevant Data Sources

- Administrative Records
- Patient Survey
- Medical Records
One Quality Metric may use Two Different Data Sources

• Administrative Data and Survey Data

  Process Measure: Parent reports of having an asthma action plan for their child with asthma

  • Denominator = Children with asthma in a given system
    – Obtained from health plan administrative data

  • Numerator = Parent of children reporting they have an asthma action plan for their child
    – Obtained from parent survey data
Exercise: What’s wrong with this measure?

- **Data Source**: Medical Records Data
- All children presenting to the ED with an acute exacerbation of asthma should have had their SaO$_2$ measured as part of their initial assessment
Improved

• Children evaluated in the ED with an acute exacerbation of asthma during the past 12 months should have had their SaO₂ measured as part of their initial assessment within 30 minutes of arrival to the ED
Exercise: What’s wrong with this measure?

- **Data Source**: Medical Records Data
- Children with asthma should have received SABA in the first hour of treatment, and then one per hour thereafter
Improved

- **Children/adolescents seen in the ED with an acute exacerbation of asthma during the past 12 months** should have received a maximum of three inhaled SABA treatments in the first hour of the ED stay and then one per hour thereafter
Exercise: What’s wrong with this measure?

- **Data Source**: Medical Records Data
- All patients diagnosed with community acquired pneumonia during the past 12 months should have had the severity of their illness assessed based on overall clinical appearance and behavior
Improved

- All patients diagnosed with community acquired pneumonia *in the hospital setting* during the past 12 months, should have had the severity of their illness assessed *at the time of admission based on the presence or absence of the following signs/symptoms:*
  - Elevated respiratory rate
  - Retractions
  - Lethargy
  - Oxygen saturation <90%
Individual/Group Time

- Measure
- Denominator
- Numerator
- Outcome or Process Measure
- Balancing Measure
Tools for Developing Improvement Strategies

- Review PDSA/PDCA
- High-Level Block Diagram
- Detailed Flow Chart

*Record system how it currently exists, not as one believes it to be ➔ These steps become targets for intervention

- Failure Mode and Effects Analysis (FMEA)
- Supplier-Customer Flowchart
- Swim-Lane Diagram
Mike Tchou’s work to reduce unnecessary electrolyte tests in hospitalized children

Legend

RESIDENT
NURSE
LAB
## Failure Mode Effects Analysis

### Medication Dispensing Process

<table>
<thead>
<tr>
<th>Steps in the Process</th>
<th>Failure Mode</th>
<th>Failure Causes</th>
<th>Failure Effects</th>
<th>Likelihood of Occurrence</th>
<th>Likelihood of Detection</th>
<th>Severity</th>
<th>Risk Profile Number (RPN)</th>
<th>Actions to Reduce Occurrence of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orders are written for new medications.</td>
<td>The first dose may be given prior to pharmacist review of the order.</td>
<td>Medication ordered may be available and easily accessed in the dispensing machine.</td>
<td>Patient may receive incorrect medication, incorrect dose, or a dose via incorrect route.</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>30</td>
<td>Assign clinical pharmacists to patient care units so that all medication orders can be reviewed as they occur.</td>
</tr>
<tr>
<td>Orders are written to discontinue a medication or change the existing order.</td>
<td>Orders are written to discontinue a medication or change the existing order.</td>
<td>All doses needed for a 24-hour period are delivered to the drawer. Drawer is not changed until next routine delivery. 24-hour supply of refrigerated medications is delivered. Multi-dose vials may be kept in the patient-specific drawer. Medications are available in dispensing machine.</td>
<td>Patients may receive medications that have been discontinued or the incorrect dose of a medication that has been changed.</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>250</td>
<td>Schedule pick-ups of discontinued medications, including refrigerated medications, twice per day. Use dispensing machine screen to verify all information regarding current and discontinued medications prior to each administration.</td>
</tr>
<tr>
<td>Orders are written for a non-standard dose of a medication.</td>
<td>Nursing staff may prepare an incorrect dose when manipulating the medication.</td>
<td>Staff prepare the dose using medications from the dispensing machine and manipulate them to get the dose ordered.</td>
<td>Patient may receive an incorrect dose.</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>60</td>
<td>Prepare all non-standard doses in the pharmacy and dispense each as a patient-specific unit dose.</td>
</tr>
</tbody>
</table>
Key Driver Diagram

**KEY DRIVER DIAGRAM**

- **Project Name:** Improve hand hygiene
- **Project Leader:** Doctor Clean

**SMART AIM**
- Increase rates of hand hygiene at patient encounters from 60% to 80% by six months

**GLOBAL AIM**
- Reduce hospital acquired infections

**KEY DRIVERS**
- Provider education
- Adequate hygiene stations
- Provider engagement

**INTERVENTIONS**
- Install sanitizer dispensers
- Solicit participation/feedback in provider meetings

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**Figure 3.** Key driver diagram for project to improve hand-hygiene rates.

Shaughnessy, JPIDS 2017
ED ‘Walk Aways’ Over Time

PDSA 1: Began moving patients out of beds after evaluation and seating them in chairs.

Baseline Median

Goal

Note: Data unavailable; new computer system underway.

Date

Percent of patients who leave unseen

2/17/16 3/14/16 4/18/16 5/23/16 6/27/16 8/1/16 9/5/16 10/10/16
Testing a Change with a Run Chart

1. Plot the baseline

2. Extend the median & begin the test
Testing a Change with a Run Chart

3. Continue to plot data following the change

4. Apply the rules

5. If there was a signal, re-plot with new median
A Run

• A run is a sequence of consecutive points which all lie on the same side of the line

• Ignore points exactly on the line!
Signals

8 points above median (ignore point on center line)

6 points below median

6 points below median
Control Chart

Number of Patient Complaints Per Month

- UCL = 44.855
- LCL = 13.645

Month:
- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec

Number of Complaints:
- 5
- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
There’s so much more to learn...

- Static Vs. Dynamic Data
- Driver Diagrams
- Family of Measures
- Cause and Effect Diagrams
- Divergent & Convergent Thinking
- Force Field Analysis
- Pareto Analysis
- And much more...
IHI resources

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Special Thanks...

- Faculty Development Team – Dr. Kupesic and Dr. Mulla
- The other speakers
- IHI – Tons of great free QI education and toolkit
- APA QSIS Program